

# Nanshan VLBI Station Report for 2008

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## Abstract

The Nanshan 25-meter radio telescope is operated by Urumqi Observatory. This report describes the activities and the status of Nanshan VLBI station as an IVS network station in 2008.

## 1. Introduction

The station is located 70 km south of Urumqi, the capital city of Xinjiang Uygur Autonomous Region of China. The station is affiliated with the Urumqi Observatory of the National Astronomical Observatories, CAS. We contribute to IVS in geodetic VLBI observations. The Nanshan VLBI station has participated in domestic VLBI experiments and as one of the VLBI ground stations tracking the Chinese Chang'E satellite. Urumqi also participated in the Japanese SELENE observations. The telescope participated in real-time experiments among the Chinese VLBI Network. We are grateful for the kind help and support from the VLBI experts within the IVS community. The Urumqi Observatory is willing to continue the collaboration in international VLBI activities.

## 2. Telescope Status

### 2.1. Antenna

- Diameter: 25 meter
- Antenna type: Modified Cassegrain
- Seat-rack type: Azimuth-pitching ring
- Main surface precision: 0.40 mm (rms)
- Pointing precision: 15'' (rms)
- Rolling range: Azimuth:  $-270^\circ$  to  $270^\circ$ ; Elevation:  $5^\circ$  to  $88^\circ$
- Maximum rolling speed: Azimuth:  $1.0^\circ/\text{sec}$ ; Elevation:  $0.5^\circ/\text{sec}$

### 2.2. Receivers

The basic specifications of the receivers and the antenna sensitivity are given in Table 1.

### 2.3. Recording System

Mark 5A, Mark IV, Mark II, and K5 recording systems are available at the Nanshan VLBI station. The performance of the observing system has been improved over the last year. The Field System has been upgraded to version 9.10.3, and it works well. A DBBC System that had been at Shanghai Astronomical Observatory (SHAO) was installed at Urumqi for the Chinese Chang'E lunar project in 2008.

Table 1. Specifications of receivers

Parameters				Freq. Range (MHz)
1.3 cm	LCP	T <sub>sys</sub> =190K	DPFU=0.057	22100–24000
3.6 cm	RCP	T <sub>sys</sub> =50K	DPFU=0.093	8100–8900
6 cm	dual	T <sub>sys</sub> =22K	DPFU=0.11	4700–5110
13 cm	RCP	T <sub>sys</sub> =70K	DPFU=0.096	2150–2450
18 cm	dual	T <sub>sys</sub> =24K	DPFU=0.088	1400–1720
30 cm	LCP	T <sub>sys</sub> =160K	DPFU=0.06	800–1200
49 cm	dual	T <sub>sys</sub> =?	DPFU=?	560–660
92 cm	dual	T <sub>sys</sub> =?	DPFU=?	305–345

## 2.4. Time and Frequency System

The No.11 H-maser was upgraded at SHAO, and it is now in good status. The other two H-masers, the MHM2010 imported from the Symmetricom company in the United States and the No. 13, work well. The time and frequency comparison system operates continuously.

## 3. Activities during 2008

### 3.1. Geodetic VLBI Observations

Nanshan participated in eight geodetic VLBI sessions, and all experiments were recorded using Mark 5A. The details are listed in Table 2 below. All geodetic 24-hour experiments of 2008 were completed without problems.

Table 2. Geodetic VLBI experiments observed by Urumqi Observatory during 2008.

Experiment	Date	Remarks (problems)
T2054	03.01	OK
T2055	06.24	OK
T2056	07.29	OK
T2057	09.23	OK
T2058	11.11	OK
T2059	12.16	OK
APSG22	09.09	OK
APSG23	10.08	OK

### 3.2. International e-VLBI Activities

Urumqi was connected at 622 Mbps to CSTnet on December 15, and CSTnet opened the international network to JIVE. A number of e-VLBI test experiments were performed at the rate of 512 Mbps between Urumqi and Shanghai from December 15 onward. The international

connection between Urumqi, Shanghai, and JIVE successfully achieved a data rate of 512 Mbps on December 19, 2008, and fringes were detected among Urumqi, Shanghai, European, and Australian telescopes on December 22, 2008.

#### 4. Personnel

Table 3. The main staff at Nanshan VLBI Station

Name	Position	Working area	e-mail
Na Wang	Professor	Station chief	na.wang@uao.ac.cn
Aili Yusup	Professor	Chief engineer	aliyu@uao.ac.cn
Zhengwen Sun	Senior engineer	Microwave, Receiver	sunzw@uao.ac.cn
Xiang Liu	Professor	VLBI friend	liux@uao.ac.cn
Yousuo Dong	Senior engineer	Antenna control	dongys@uao.ac.cn
Maozheng Chen	Senior engineer	Receiver	mzchen@uao.ac.cn
Aili Esamdin	Scientist	Astronomy	aliyi@uao.ac.cn
Jarken Yesembek	Scientist	Astronomy	jerken@uao.ac.cn
Weixia Wang	Senior engineer	Receiver	wangwx@uao.ac.cn
Minghui Shao	Senior engineer	Time and Freq., Terminal	shaomh@uao.ac.cn
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Shiqiang Wang	Engineer	Antenna	Wangshq@uao.ac.cn
Hua Zhang	Engineer	Terminal, Time and Freq.	zhangh@uao.ac.cn
Guanghui Li	Engineer	Network, Computer	ligh@uao.ac.cn
Jun Ma	Engineer	Receiver	majun@uao.ac.cn
Chenyu Chen	Engineer	Antenna	chency@uao.ac.cn
Xiangfeng Wang	Engineer	Network, Computer	wangxf@uao.ac.cn

#### 5. Future Plans

In 2009, a new 1.3 cm dual polarization cryogenic receiver will be completed. Dual band receivers for both 92 cm and 49 cm were completed last year and will be further tested. A room temperature 13 cm dual polarization receiver is being built. A new Mark 5B+ recording system will be used at the end of 2009. The S/X band feed horn will be replaced by a new one this year.